Claims

What is claimed is:

1. A speaker verification method comprising the steps of:

(a) generating a code book covering a plurality of speakers having a plurality of training utterances for each of the plurality of speakers;

(b) receiving a plurality of test utterances from a speaker;

(c) comparing each of the plurality of test utterances to each of the plurality of training utterances for the speaker to form a plurality of decisions, one decision of the plurality of decisions for each of the plurality of test utterances;

(d) weighting each of the plurality of decisions to form a plurality of weighted decisions; and

(e) combining the plurality of weighted decisions to form a verification decision.

2. The method of claim 1, wherein step (c) further includes the step of:

(c1) comparing each of the plurality of test utterances to each of a plurality of impostor utterances.

3. The method of claim 1, wherein step (d) further includes the steps of:

(d1) determining a measure of confidence for each of the plurality of decisions;

(d2) assigning a weight for each of the plurality of decisions based on the measure of confidence.

4. The method of claim 1, wherein step (a) further includes the steps of:

(a1) separating the plurality of speakers into a male group and a female group;

(a2) determining a male variance vector from the male group;

(a3) determining a female variance vector from the female group.

5. The method of claim 1, wherein step (c) further including the steps of:

(c1) determining if the speaker of the plurality of test utterances is a male or a female;

(c2) when the speaker is male, using the male variance vector to determine a weighted Euclidean distance between each of the plurality of test utterances and each of the plurality of training utterances for the speaker;

(c3) forming a decision for each of the plurality of test utterances based on the weighted Euclidean distance.

6. The method of claim 4, wherein step (c) further including the steps of:

(c1) determining if the speaker of the test utterances is a male or a female;

(c2) when the speaker is female, using the female variance vector to determine a weighted Euclidean distance between each of the plurality of test utterances and each of the plurality of training utterances for the speaker;

(c3) forming a decision for each of the plurality of test utterances based on the weighted Euclidean distance.

7. The method of claim 1, wherein step (a) further includes the steps of:

(a1) receiving a sample utterance;

(a2) segmenting the sample utterance into a voiced sounds and an unvoiced sounds;

(a3) storing the voiced sounds as one of the plurality of training utterances.

8. The method of claim 7, wherein step (b) further includes the steps of:

(b1) receiving an input set of utterances;

(b2) segmenting the input set of utterances into the voiced sounds and the unvoiced sounds;

(b3) storing the voiced sounds to form the plurality of test utterances.

9. A method of speaker verification, comprising the steps:

(a) generating a code book containing a plurality of training utterances for a plurality of people and a male variance vector, a female variance vector and a plurality of impostor utterances;

(b) receiving a plurality of test utterances from a speaker;

(c) determining if the speaker is a male;

(d) when the speaker is male, using the male variance vector to determine a weighted Euclidean distance between each of the plurality of test utterances and the plurality of training utterances;

(e) determining a weighted Euclidean distance between each of the plurality of test utterances and the plurality of impostor utterances;

(f) forming a decision for each of the plurality of test utterances to form a plurality of decisions; and

(g) combining the plurality of decisions to form the verification decision.

10. The method of claim 9, wherein step (f) further includes the step of:

(f1) comparing the weighted Euclidean distance for each the plurality of training utterances to the weighted Euclidean distance for each of the plurality of impostor utterances to form a comparison;

(f2) forming a decision based on the comparison.

11. The method of claim 9, wherein step (g) further includes the steps of:

(g1) weighting each of the plurality of decisions based on a confidence measure to form a plurality of weighted decisions;

(g2) summing the plurality of weighted decisions to form a verification decision.

12. The method of claim 9, wherein step (a) further includes the steps of:

(a1) receiving a sample utterance;

(a2) segmenting the sample utterance into a voiced sounds and an unvoiced sounds;

(a3) storing the voiced sounds as one of the plurality of training utterances.

13. The method of claim 12, wherein step (b) further includes the steps of:

(b1) receiving an input set of utterances;

(b2) segmenting the input set of utterances into the voiced sounds and the unvoiced sounds;

(b3) storing the voiced sounds to form the plurality of test utterances.

14. A computer readable storage medium containing computer readable instructions that when executed by a computer performs the following steps:

(a) generates a code book covering a plurality of speakers having a plurality of training utterances for each of the plurality of speakers;

(b) receives a plurality of test utterances from a speaker;

(c) compares each of the plurality of test utterances to each of the plurality of training utterances in the code book to form a plurality of decisions, one decision of the plurality of decisions for each of the plurality of test utterances;

(d) weights each of the plurality of decisions to form a plurality of weighted decisions; and

(e) combines the plurality of weighted decisions to form a verification decision.

15. The method of claim 14, wherein step (c) further includes the step of:

(c1) comparing each of the plurality of test utterances to each of a plurality of impostor utterances.

16. The computer readable storage medium of claim 14, wherein step (d) further includes the steps of:

(d1) determines a measure of confidence for each of the plurality of decisions;

(d2) assigns a weight for each of the plurality of decisions based on the measure of confidence.

17. The computer readable storage medium of claim 14, wherein step (a) further includes the steps of:

(a1) separates the plurality of speakers into a male group and a female group;

(a2) determines a male variance vector from the male group;

(a3) determines a female variance vector from the female group.

18. The computer readable storage medium of claim 14, wherein step (c) further including the steps of:

(c1) determines if the speaker of the plurality of test utterances is a male or a female;

(c2) when the speaker is male, using the male variance vector to determine a weighted Euclidean distance between each of the plurality of test utterances and each of the plurality of training utterances for the speaker;

(c3) forms a decision for each of the plurality of test utterances based on the weighted Euclidean distance.

19. The computer readable storage medium of claim 17, wherein step (c) further including the steps of:

(c1) determines if the speaker of the plurality of test utterances is a male or a female;

(c2) when the speaker is female, using the female variance vector to determine a weighted Euclidean distance between each of the plurality of test utterances and each of the plurality of training utterances for the speaker;

(c3) forms a decision for each of the plurality of test utterances based on the weighted Euclidean distance.

20. The computer readable storage medium of claim 14, wherein step (a) further includes the steps of:

(a1) receives a sample utterance;

(a2) segments the sample utterance into a voiced sounds and an unvoiced sounds;

(a3) stores the voiced sounds as one of the plurality of training utterances.

21. The computer readable storage medium of claim 20, wherein step (b) further includes the steps of:

(b1) receives an input set of utterances;

(b2) segments the input set of utterances into the voiced sounds and the unvoiced sounds;

(b3) stores the voiced sounds to form the plurality of test utterances.

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